EXHIBIT A

In re Application of:
   Michael S. Rothberg
Serial No.: ~~09/080,784~~ 10/080,784
Filed: 02/22/02
Title: DISK DRIVE EMPLOYING DATA
   AVERAGING TECHNIQUES DURING
   RETRY OPERATIONS TO FACILITATE
   DATA RECOVERY

Group Art Unit: 2651
Examiner: Slavitt, M. R.

RESPONSE TO NOTICE OF NON-COMPLIANT AMENDMENT

THE COMMISSIONER FOR PATENTS
ALEXANDRIA, VA 22313

Dear Sir,

    A notice of non-compliant amendment was mailed on 05/24/05 for the above-identified patent application which objected to the claim status identifier of "presently amended". Accordingly, please enter the following correction to the amended claims:

In the Claims:

1 Please cancel, without prejudice, claims 2, 6, 7, 15, 19 and 20.

2 Please amend the remaining claims as follows:

3 1.   (currently amended) A disk drive comprising:

4   (a) a disk comprising a plurality of tracks, each track comprising a plurality of data

5   sectors;

6   (b) a head actuated radially over the disk, the head for generating a read signal while

7   reading data from at least one of the data sectors;

8   (c) a sampling device for sampling the read signal to generate read signal sample values;

9   (d) a sequence detector for detecting an estimated data sequence from the read signal

10   sample values;

11   (c)(e) a buffer for buffering read data associated with the read signal;

12   (d)(f) a disk controller for processing a read command received from a host computer by:

13   positioning the head over a selected data sector to generate a first read signal;

14   sampling the first read signal to generate a first sequence of read signal sample

15   values;

16   detecting a first estimated data sequence using the sequence detector from the first

17   sequence of read signal sample values;

18   storing in the buffer first read data associated with the first read signalthe first

19   estimated data sequence;

20   if a read error occurs:

21   repositioning the head over the selected data sector to generate a second read

22   signal;

23   sampling the second read signal to generate a second sequence of read signal

24   sample values;

25   detecting a second estimated data sequence using the sequence detector from the

26   second sequence of read signal sample values;

27   averaging ~~second read data associated with the second read signal~~the second

28   estimated data sequence with the first ~~read data~~estimated data sequence stored

29   in the buffer to generate an averaged estimated data sequence ~~read data~~;

30   storing the averaged ~~read data~~estimated data sequence in the buffer; and

31   processing the averaged ~~read data~~estimated data sequence stored in the buffer to

32   recover the selected data sector.

1   2.   (canceled)

1   3.   (currently amended) The disk drive as recited in ~~claim 2~~claim 1, wherein the disk

2   controller implements an error correction code (ECC) for detecting and correcting errors

3   in the averaged ~~binary bits~~estimated data sequence.

1   4.   (currently amended) The disk drive as recited in claim 3, wherein:

2   (a) the averaged estimated data sequence comprises averaged binary bits;

3   ~~(a)~~(b) the averaged binary bits are grouped into ECC symbols;

4   ~~(b)~~(c) a reliability metric is generated for each ECC symbol in response to a reliability

5   derived from averaging the binary bits; and

6   ~~(e)~~(d) the disk controller processes the reliability metrics to augment the ECC.

1   5.   (original) The disk drive as recited in claim 4, wherein:

2   (a) at least one erasure pointer is generated from the reliability metrics; and

3   (b) the disk controller processes the erasure pointer to increase the number of correctable

4   ECC symbols.

1   6.   (canceled)

1   7.   (canceled)

1   8.   (currently amended) The disk drive as recited in ~~claim 7~~claim 1, ~~wherein the read channel~~

2   ~~comprises~~further comprising:

3   ~~(a)~~an equalizer filter for filtering the ~~averaged~~ read signal sample values to ~~generated~~

4   generate equalized read signal sample values, wherein the sequence detector detects the

5   estimated data sequences from the equalized sample values.~~; and~~

6   ~~(b)a sequence detector for detecting the estimated data sequence from the equalized read~~

7   ~~signal sample values.~~

1   9.   (original) The disk drive as recited in claim 1, wherein the disk controller adjusts at least

2   one parameter of the disk drive prior to rereading the selected data sector.

1   10.   (original) The disk drive as recited in claim 9, wherein the disk controller adjusts a read

2   channel parameter.

1   11.   (original) The disk drive as recited in claim 9, wherein the disk controller adjusts a servo

2   control parameter.

1   12.   (original) The disk drive as recited in claim 11, wherein the disk controller adjusts a

2   tracking offset to at least two different settings wherein for each tracking offset setting

3   the disk controller performs at least one reread of the selected data sector to generate the

4   averaged read data.

1   13.   (original) The disk drive as recited in claim 12, wherein for each tracking offset setting

2   the disk controller performs multiple rereads of the selected data sector to generate the

3   averaged read data.

1   14.   (currently amended) A method of recovering an errant data sector in a disk drive, the disk

2   drive comprising a disk having a plurality of tracks, each track comprising a plurality of

3   data sectors, a head actuated radially over the disk, the head for generating a read signal

4   while reading data from at least one of the data sectors, <u>a sampling device for sampling</u>

5   <u>the read signal to generate read signal sample values, a sequence detector for detecting an</u>

6   <u>estimated data sequence from the read signal sample values,</u> and a buffer for buffering

7   read data associated with the read signal, the method comprising the steps of:

8   (a) receiving a read command from a host computer;

9   (b) positioning the head over a selected data sector to generate a first read signal;

10   (c) <u>sampling the first read signal to generate a first sequence of read signal sample</u>

11   <u>values;</u>

12   (d) <u>detecting a first estimated data sequence using the sequence detector from the first</u>

13   <u>sequence of read signal sample values;</u>

14   (c)(e) storing in the buffer <u>the first estimated data sequence</u> first read data associated

15   with the first read signal;

16   if a read error occurs:

17   (d)(f) repositioning the head over the selected data sector to generate a second read

18   signal;

19   (g) <u>sampling the second read signal to generate a second sequence of read signal</u>

20   <u>sample values;</u>

21   (h) <u>detecting a second estimated data sequence using the sequence detector from the</u>

22   <u>second sequence of read signal sample values;</u>

23   (e)(i) averaging <u>the second estimated data sequence</u> second read data associated with

24   the second read signal with the first read data<u>estimated data sequence</u> stored in the

25   buffer to generate <u>an</u> averaged read data<u>estimated data sequence</u>;

26   (f)(j) storing the averaged read data<u>estimated data sequence</u> in the buffer; and

27   (g)(k) processing the averaged ~~read data~~estimated data sequence stored in the buffer

28   to recover the selected data sector.

1   15.   (canceled)

1   16.   (currently amended) The method as recited in ~~claim 15~~claim 14, ~~further~~

2   ~~comprising~~wherein the step of processing the averaged estimated data sequence

3   comprises the step of using an error correction code (ECC) for detecting and correcting

4   errors in the averaged ~~binary bits~~estimated data sequence.

1   17.   (currently amended) The method as recited in claim 16, wherein the averaged estimated

2   data sequence comprises averaged binary bits, and the step of using the ECC for

3   detecting and correcting errors further comprising the steps of:

4   (a) grouping the averaged binary bits into ECC symbols;

5   (b) generating a reliability metric for each ECC symbol in response to a reliability

6   derived from averaging the binary bits; and

7   (c) processing the reliability metrics to detect and correct errors in the averaged

8   binary data.

1   18.   (original) The method as recited in claim 17, further comprising the steps of:

2   (a) generating at least one erasure from the reliability metrics; and

3   (b) processing the erasure pointer to increase the number of correctable ECC

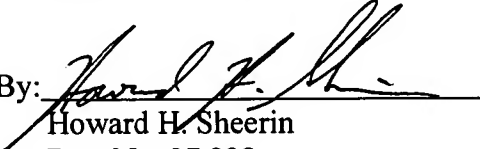4   symbols.

1   19.   (canceled)

1   20.   (canceled)

1 21. (currently amended) The method as recited in ~~claim 20~~claim 14, further comprising the

2 steps of~~:~~

3 ~~(a)~~filtering the ~~averaged~~read signal sample values to generated equalized read signal

4 sample values, wherein the sequence detector detects the estimated data sequences

5 from the equalized sample values.~~; and~~

6 ~~(b)detecting the estimated data sequence from the equalized read signal sample~~

7 ~~values.~~

1 22. (original) The method as recited in claim 14, further comprising the step of adjusting at

2 least one parameter of the disk drive prior to rereading the selected data sector.

1 23. (original) The method as recited in claim 22, wherein the step of adjusting a parameter of

2 the disk drive comprises the step of adjusting a read channel parameter.

1 24. (original) The method as recited in claim 22, wherein the step of adjusting a parameter of

2 the disk drive comprises the step of adjusting a servo control parameter.

1 25. (original) The method as recited in claim 24, further comprising the steps of adjusting a

2 tracking offset to at least two different settings wherein for each tracking offset setting

3 rereading the selected data sector at least once to generate the averaged read data.

1 26. (original) The method as recited in claim 25, wherein for each tracking offset setting

2 rereading the selected data sector multiple times to generate the averaged read data.

CONCLUSION

The examiner is encouraged to contact the undersigned over the telephone in order to resolve any remaining issues that may prevent the immediate allowance of the present application.

Respectfully submitted,

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on:

＿6/17/05＿ Howard H. Sheerin＿＿
(Date)   (Print Name)

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(Signature)